UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,850	09/05/2003	John Yasaitis	2550/184	8594

2101 7590 10/27/2006

BROMBERG & SUNSTEIN LLP
125 SUMMER STREET
BOSTON, MA 02110-1618

EXAMINER	
LEE, PATRICK J	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 10/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/656,850	YASAITIS, JOHN	
	Examiner	Art Unit	
	Patrick J. Lee	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-9,12-19 and 21-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-9,12-19 and 21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is in response to amendment filed October 10, 2006.

Drawings

2. The drawings were received on 10/10/2006. These drawings are acceptable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 5-9, 12-19, & 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,426,069 to Selvakumar et al.

With respect to claim 1, Selvakumar et al disclose a photodiode device comprising: Ge implant area (8) or SiGe region (see figure 14) as a germanium-based photodiode (see column 6, lines 56-57); and polysilicon layer (9) or polysilicon gate (see figure 14) as a polysilicon-based receiving electrode coupled with the photodiode while permitting the light to pass through to the photodiode region (see column 6, lines 53-56). While Selvakumar et al does not explicitly disclose that polysilicon layer (9) is electrically coupled to the germanium-based photodiode, Selvakumar et al discloses the polysilicon gate as a critical part of the SiGe photogate (see column 6, lines 35-38). The polysilicon gate is the portion that allows the radiation absorbed by the SiGe region from being transferred to the transfer gate, which would then transfer to the CCD shift

register. The polysilicon portion of the gate would effectuate the transfer of the signal produced by the SiGe region. The existence of a connection between the polysilicon layer with the germanium based photodiode have been obvious to one of ordinary skill in the art because such would allow the device to appropriately collect radiation at desired timing schedules (see column 6, lines 60-62).

With respect to claim 2, the modified Selvakumar et al disclose the polysilicon gate being doped (see column 3, lines 49-55).

With respect to claim 3, the use of an n-type dopant is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for the desired range of radiation to pass through, while absorbing other radiation (see column 6, lines 53-56).

With respect to claim 5, the use of a bottom electrode coupled to the photodiode is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for additional control and monitoring over the operating parameters of the photodiode.

With respect to claim 6, the use of a waveguide is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for the device taught by Selvakumar et al to be disposed away from the source of radiation sensed.

With respect to claim 7, the modified Selvakumar et al discloses the use of SiO_2 layer as an intrinsic region between the photodiode region and the polysilicon layer, but does not explicitly disclose the doping of the photodiode as claimed. However, such

would have been obvious to one of ordinary skill in the art to allow the device flexibility and accuracy in sensing certain wavelength ranges of radiation.

With respect to claims 8-9, Selvakumar et al disclose a photodiode device comprising: Ge implant area (8) or SiGe region (see figure 14) as a germanium-based photodiode (see column 6, lines 56-57); and polysilicon layer (9) or polysilicon gate (see figure 14) as a polysilicon-based receiving electrode coupled with the photodiode while permitting the light to pass through to the photodiode region (see column 6, lines 53-56). Selvakumar et al discloses the use of SiO_2 layer as an intrinsic region between the photodiode region and the polysilicon layer, but does not explicitly disclose the doping of the photodiode as claimed. However, such would have been obvious to one of ordinary skill in the art to allow the device flexibility and accuracy in sensing certain wavelength ranges of radiation. While Selvakumar et al does not explicitly disclose that polysilicon layer (9) is electrically coupled to the germanium-based photodiode, Selvakumar et al discloses the polysilicon gate as a critical part of the SiGe photogate (see column 6, lines 35-38). The polysilicon gate is the portion that allows the radiation absorbed by the SiGe region from being transferred to the transfer gate, which would then transfer to the CCD shift register. The polysilicon portion of the gate would effectuate the transfer of the signal produced by the SiGe region. The existence of a connection between the polysilicon layer with the germanium based photodiode have been obvious to one of ordinary skill in the art because such would allow the device to appropriately collect radiation at desired timing schedules (see column 6, lines 60-62).

With respect to claim 12, the use of a bottom electrode coupled to the photodiode is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for additional control and monitoring over the operating parameters of the photodiode.

With respect to claim 13, the thickness of the electrode is not disclosed, but such would have been obvious to one of ordinary skill in the art in order to give the electrode the transparency required to allow the light to pass through to the photodiode.

With respect to claim 14, the concentration of polysilicon is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow the electrode to remain transparent while capable of its conduction of electric signals.

With respect to claim 15, the use of polysilicon germanium is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for compatibility between the electrode and the photodiode.

With respect to claim 16, the modified Selvakumar et al disclose a photodiode device comprising: Ge implant area (8) or SiGe region (see figure 14) as a germanium-based photodiode (see column 6, lines 56-57); and polysilicon layer (9) or polysilicon gate (see figure 14) as a polysilicon-based means for receiving light to be converted by the photodiode while permitting the light to pass through to the photodiode region. The polysilicon gate is used for transferring the signal from the photodiode to shift register (see figures 15-17).

With respect to claim 17, the concentration of polysilicon is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow the electrode to remain transparent while capable of its conduction of electric signals.

With respect to claim 18, the modified Selvakumar et al disclose the polysilicon gate being doped (see column 3, lines 49-55).

With respect to claim 19, the use of a bottom electrode coupled to the photodiode is not explicitly disclosed, but such would have been obvious to one of ordinary skill in the art because such would allow for additional control and monitoring over the operating parameters of the photodiode.

With respect to claim 21, the doping process after the receiving electrode is coupled with the photodiode, but such would have been obvious to one of ordinary skill in the art in order to allow for accuracy in detection of the radiation.

With respect to claims 22-23, the modified Selvakumar et al disclose the photo-generated carriers comprising electron hole pairs (see column 6, lines 56-57).

Response to Arguments

5. Applicant's arguments with respect to claim 1-3, 5-9, 12-19, & 21-23 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant's arguments filed 10/10/2006 have been fully considered but they are not persuasive.

Applicant asserts that the SiO2 layer is an insulator. However, there is no basis for this conclusion shown by the applicant in the Selvakumar et al prior art.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Lee whose telephone number is (571) 272-2440. The examiner can normally be reached on Monday through Friday, 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patrick J. Lee
Examiner
Art Unit 2878

PJL
October 19, 2006

Stephone B. Allen
Primary Examiner